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EXAMINER	
TAYONG, HELENE E	

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/777,612	BHAKTA ET AL.	
	Examiner	Art Unit	
	Helene Tayong	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 December 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment filed on 12/13/ 2007.

Claims 1-25 are pending in the application. Claims 1-25 are rejected.

Response to Amendment

2. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1- 4,7,12, 14 and16 are rejected under 35 U.S.C. 102(e) as being anticipated by Garlepp et al (US 20060233291).

(1) with regards to claims 1 and12;

Garlepp et al discloses a receiver equalizer (fig. 1, 103) comprising:

a sampler (105) that samples a signal indicative of an input communication signal to determine digital decision output signals having a predetermined data rate (page 1, [0004]);

a filter (112) that receives digital decision output signals from said sampler and generates equalization signals therefrom (page 1, [0004]); and

a summer (115) coupled to the sampler and the filter, said summer combines together the input communication signal with the equalization signals (page 1, [0004]).

wherein a pluralities of clocks (figs. 7-10) control timing associated with the sample, said clocks having frequencies that are less than a data rate of the communication device (page 6, [0075]-[0076]).

(2) with regards to claim 2;

wherein said clocks (figs. 8 and 10) have frequencies that are one-half the predetermined data rate (page 6, [0075]-[0076]).

(3) with regards to claim 3;

wherein said clocks (figs. 8 and 10) include two clocks that are 180 degrees out of phase with respect to each other and activate the sampler on rising edges of the two clocks (page 6, [0075]-[0076]).

(4) with regards to claim 4;

wherein said plurality of clocks (figs. 8, 10, 14) comprise a set of quadrature clocks (page 6, [0075]- [0076] and page 8, [0086])

(4) with regards to claims 7 and 16 ;

wherein the filter (112) receives unlatched digital decision output signals(106) from said sampler(105) (page 1, [0004]).

(5) with regards to claim 14;

wherein said quadrature clocks (figs. 7-10 and 14) have frequencies that are less

than a data rate of said digital decision output signals (page 6, [0075]-[0076] and page 8, [0086]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 5, 8,10,11,13,17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garlepp et al (US 20060233291) in view of Park et al.(US 2004/0076228 A1).

(1) with regards to claim 5;

Garlepp et al discloses a clock circuit (fig. 1, 107) coupled to said filter (112)and said sampler (105), said

Garlepp et al discloses all of subject matter as described above except for specifically teaching clock circuit generates a plurality of inter-symbol interference ("ISI") cancellation clock signals that operate said filter from the set of quadrature clocks used to operate the sampler.

However, Park et al. in the same field of endeavor, teaches a clock circuit generates a plurality of inter-symbol interference ("ISI") cancellation clock signals (fig. 4, pg. 3, [0034], lines 1-16).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to incorporate the teaching of Park et al. in the method of Garlepp et al in order to generate a plurality of inter-symbol interference ("ISI") cancellation clock signals that operate said filter from the set of quadrature clocks used to operate the sampler . The motivation to utilize Park et al's clocks instead of Garlepp et al's was to improve on high speed transmission.

(5) with regards to claims 8 and17;

Garlepp et al discloses all of subject matter as described above except for specifically teaching wherein said sampler comprises a pair of processing paths, one path for generating gradient bits and another path for generating data bits , each path comprising an amplifier and at least one sense amplifier.

However, Park et al. in the same field of endeavor, teaches wherein said sampler comprises a pair of processing paths, one path for generating gradient bits (odd) and another path for generating data bits (even), each path comprising an amplifier(113) and at least one sense amplifier(125) (pg. 3, [0035], lines 1-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the processing paths of Park et al.'s to the system of Garlepp et al in order to compensate for attenuated high -frequency component signals so that a skew between data and clock are compensated for. The motivation to add these processing paths will be to facilitate a high speed data transmission (pg.2, [0019], lines 6-7).

(6) with regards to claims 10 and 19;

Garlepp et al discloses all of subject matter as described above except for

specifically teaching wherein the filter comprises one or more taps, the sampler comprises one or more sense amplifiers, and wherein equalization can be disabled in the equalizer while preserving currents from the one or more taps by forcing the one or more sense amplifiers into a pre-charge state.

However, Park et al. in the same field of endeavor, teaches wherein the filter comprises one or more taps, the sampler comprises one or more sense amplifiers (fig. 6, 121-128), and wherein equalization can be disabled in the equalizer while preserving currents from the one or more taps by forcing the one or more sense amplifiers into a pre-charge state (pg. 3, table 1, [0041], lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the method of equalization of Park et al in order to acquire the optimal sampling clock for sampling the external data signal. The motivation to combine Park et al's method of equalization will be to achieve a high speed equalization when receiving data.

(7) with regards to claim 11;

Garlepp et al discloses all of subject matter as described above except for specifically teaching wherein equalization can be enabled by releasing the one or more sense amplifiers from the pre-charge state.

However, Park et al. in the same field of endeavor, teaches wherein equalization can be enabled by releasing the one or more sense amplifiers from the pre-charge state (pg. 3, table 1, [0041], lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to utilize the method of equalization of Park et al in order to acquire the optimal sampling clock for sampling the external data signal. The motivation to utilize Park et al's method of equalization will be to achieve a high speed equalization when receiving data.

(8) with regards to claim 13;

Garlepp et al discloses all of subject matter as described above except for specifically teaching wherein the clock circuit comprises variable time delay elements whose time delay can be set during a calibration of the ISI cancellation clocks.

However, Park et al. in the same field of endeavor, teaches wherein the clock circuit comprises variable time delay elements whose time delay can be set during a calibration of the ISI cancellation clocks (Table 1, pg. 3, [0040], lines 5-9).

Due to a difference in time required for transmitting signals through channels, there is a time skew between transmitted signals or between a clock and a transmitted signal. The skew has an adverse effect on signal transmission at a high speed. It would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that for the normal operation of an input circuit in a receiver, a setup/hold time should be sufficient (pg. 1, [0011], lines 8-9).The motivation to utilize Park et al's clocks instead of Garlepp et al's was to improve on high speed transmission.

7. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garlepp et al (US 20060233291) in view of Chen et al.(US 7092437 B2).

(1) with regards to claims 6 and 15;

Garlepp et al discloses all of subject matter as described above except for

specifically teaching wherein the equalizer includes a sensitivity test process in which the at-speed sensitivity of the equalizer can be determined, the process includes disabling an input amplifier, providing a predetermined set of tap coefficients to the filter, determining if the sampler generates a repeating pattern associated with the set of tap coefficients, and repeating the sensitivity test process with other predetermined sets of tap coefficients until the sampler no longer determines the repeating pattern associated the set of tap coefficients provided to the filter .

However, Chen et al. in the same field of endeavor teaches wherein the equalizer includes a sensitivity test process in which the at-speed sensitivity (interpreted as optimal training interval) of the equalizer can be determined, the process includes disabling an input amplifier, providing a predetermined set of tap coefficients to the filter, determining if the sampler generates a repeating pattern associated with the set of tap coefficients, and repeating the sensitivity test process with other predetermined sets of tap coefficients until the sampler no longer determines the repeating pattern associated the set of tap coefficients provided to the filter (col. 1, lines 39-54) .

Some current training-based equalization algorithms include schemes for determining intervals for initiating a training sequence. The idea of these schemes is that no training sequence is transmitted until the abrupt change detection algorithm detects changes in channel parameters that may cause an equalizer failure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the sensitivity test process of Chen et al. in the equalizer system of Garlepp et

al in order to re-adjust the channel estimates at the receiver so as to recover from channel failure. The motivation to combine these would be to provide a training decision scheme having reduced complexity and improved channel utilization.

8. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garlepp et al (US 20060233291) in view of Tonietto et al (US2005/0135471 A1).

(1) with regards to claims 9 and18 ;

Garlepp et al discloses all of subject matter as described above except for specifically teaching the equalization signals comprise inter-symbol interference ("ISI") equalization currents and the equalizer further comprises an input amplifier coupled to the summer and having a gain and the equalizer also comprises a coefficient normalization circuit that normalizes the ISI equalization currents to the input amplifier's gain.

However, Tonietto et al. in the same field of endeavor teaches wherein the equalization signals comprise inter-symbol interference ("ISI") equalization currents ([pg. 1, [0011], lines 1-6) and the equalizer further comprises an input amplifier coupled to the summer (fig. 4, 460) and having a gain and the equalizer also comprises a coefficient normalization circuit that normalizes the ISI equalization currents to the input amplifier's gain (fig. 2, [008], lines 1-13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize equalization signals comprise inter-symbol interference ("ISI") equalization currents of Torietto et al.'s to the equalization system of Garlepp et al's equalizer in order to efficiently recover data from the data stream in the signal

received via the communication media. The motivation to utilize Torietto et al.'s signals equalization signals was to improve on speed of receiver and compensate for the distortions of the channel.

9. Claims 20, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garlepp et al (US 20060233291) in view of Park et al (US 2004/0076228 A1) and further in view of Chen et al. (US 7092437 B2).

(1) with regards to claim 20;

Garlepp et al discloses a receiver equalizer (fig. 1, 103) comprising:

sampler (105) that samples a signal indicative of an input communication signal to determine digital decision output signals having a predetermined data rate (page 1, [0004]).

a filter (112) that receives digital decision output signals from said sampler and generates equalization signals therefrom (page 1, [0004]); and

a summer (115) coupled to the sampler (105) and the filter(112), said summer combines together the input communication signal (from 102) with the equalization signals(114) (page 1, [0004]).

Garlepp et al discloses all of subject matter as described above except for specifically teaching

(a) an input amplifier that receives an input communication signal.

(b) wherein the equalizer includes a sensitivity test process in which the at-speed sensitivity of the equalizer can be determined, the process includes disabling an input amplifier, providing a predetermined set of tap coefficients to the filter, determining if the

sampler generates a repeating pattern associated with the set of tap coefficients, and repeating the sensitivity test process with other predetermined sets of tap coefficients until the sampler no longer determines the repeating pattern associated the set of tap coefficients provided to the filter .

(i) with regards to item (a) above;

However, park et al. in the same field of endeavor teaches an input amplifier that receives an input communication signal (fig. 6, 111-114, pg.2, [0033], lines 1-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the input amplifier of Park et al. in the equalizer of Garlepp et al. in order to reduce the attenuation in high frequency components of signals in a transmission channel. The motivation to combine Park et al.'s input amplifier to the equalizer system of Garlepp et al will be to facilitate a high speed data transmission.

(ii) with regards to item (b) above;

Garlepp et al as modified by park discloses all of the subject matter disclosed above, but for specifically teaching wherein the equalizer includes a sensitivity test process in which the at-speed sensitivity of the equalizer can be determined, the process includes disabling an input amplifier, providing a predetermined set of tap coefficients to the filter, determining if the sampler generates a repeating pattern associated with the set of tap coefficients, and repeating the sensitivity test process with other predetermined sets of tap coefficients until the sampler no longer determines the repeating pattern associated the set of tap coefficients provided to the filter .

However, Chen et al. in the same field of endeavor teaches wherein the

equalizer includes a sensitivity test process in which the at-speed sensitivity (interpreted as optimal training interval) of the equalizer can be determined, the process includes disabling an input amplifier, providing a predetermined set of tap coefficients to the filter, determining if the sampler generates a repeating pattern associated with the set of tap coefficients, and repeating the sensitivity test process with other predetermined sets of tap coefficients until the sampler no longer determines the repeating pattern associated the set of tap coefficients provided to the filter (col. 1, lines 39-54) .

Some current training-based equalization algorithms include schemes for determining intervals for initiating a training sequence. The idea of these schemes is that no training sequence is transmitted until the abrupt change detection algorithm detects changes in channel parameters that may cause an equalizer failure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the sensitivity test process of Chen et al. in the equalizer system of Garlepp et al as modified by park in order to re-adjust the channel estimates at the receiver so as to recover from channel failure. The motivation to combine these would be to provide a training decision scheme having reduced complexity and improved channel utilization.

(2) with regards to claim 23;

Garlepp et al discloses all of subject matter as described above except for specifically teaching wherein said sampler comprises a pair of processing paths, one path for generating gradient bits and another path for generating data bits, each path comprising an amplifier and at least one sense amplifier.

However, Park et al. in the same field of endeavor, teaches wherein said sampler comprises a pair of processing paths, one path for generating gradient bits (odd) and another path for generating data bits (even), each path comprising an amplifier (113) and at least one sense amplifier(125) (pg. 3, [0035], lines 1-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the processing paths of Park et al.'s to the system of Garlepp et al as modified by park in order to compensate for attenuated high -frequency component signals so that a skew between data and clock are compensated for. The motivation to add these processing paths will be to facilitate a high speed data transmission (pg.2, [0019], lines 6-7).

(3) with regards to claim 25

Garlepp et al discloses all of subject matter as described above except for specifically teaching wherein the filter comprises one or more taps, the sampler comprises one or more sense amplifiers, and wherein equalization can be disabled in the equalizer while preserving currents from the one or more taps by forcing the one or more sense amplifiers into a pre-charge state.

However, Park et al. in the same field of endeavor, teaches wherein the filter comprises one or more taps, the sampler comprises one or more sense amplifiers (fig. 6, 121-128), and wherein equalization can be disabled in the equalizer while preserving currents from the one or more taps by forcing the one or more sense amplifiers into a pre-charge state(pg. 3, table 1, [0041], lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to utilize the method of equalization of Park et al in order to acquire the optimal sampling clock for sampling the external data signal. The motivation to combine Park et al's method of equalization will be to achieve a high speed equalization when receiving data.

10. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Garlepp et al (US 20060233291) in view of Park et al (US 2004/0076228 A1) and further in view of Chen et al (US 7092437) as applied to claims 20 above, and further in view of Sakaki et al.(US 4145747)

(1) with regards to claim 21;

Garlepp et al as modified by Park et al and Chen et al discloses all of subject matter as described above except for specifically teaching wherein the sets of tap coefficients are provided to the filter in order from a maximum value to a minimum value of the tap coefficients.

However, Sakaki et al. in the same field of endeavor, teaches the sets of tap coefficients are provided to the filter in order from a maximum value to a minimum value of the tap coefficients (fig. 1,col. 2, lines 31-36).

Tap coefficients are calculated for every operational cycle of the equalizer. This causes a slow convergence of the value to the tap coefficient. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the set of tap coefficients of Sakaki et al to the teachings of Garlepp et al as modified by Park et al and Chen et al. The motivation to utilize these tap coefficients would be to provide rapid convergence of a tap gain control coefficients.

11. Claims 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garlepp et al (US 20060233291) in view of Park et al (US 2004/0076228 A1) and further in view of Chen et al (US 7092437) as applied to claim 20 above, and further in view of Tonietto et al (US2005/0135471 A1)

(1) with regards to claim 22;

Garlepp et al further discloses wherein the filter receives unlatched digital decision output signals from said sampler (fig. 1, 112 and page 1, [0004]).

(2) with regards to claim 24 ;

Garlepp et al as modified by Park et al and Chen et al, discloses all of subject matter as described above except for specifically teaching the equalization signals comprise inter-symbol interference ("ISI") equalization currents and the equalizer further comprises an input amplifier coupled to the summer and having a gain and the equalizer also comprises a coefficient normalization circuit that normalizes the ISI equalization currents to the input amplifier's gain.

However, Tonietto et al. in the same field of endeavor teaches wherein the equalization signals comprise inter-symbol interference ("ISI") equalization currents ([pg. 1, [0011], lines 1-6) and the equalizer further comprises an input amplifier coupled to the summer (fig. 4, 460) and having a gain and the equalizer also comprises a coefficient normalization circuit that normalizes the ISI equalization currents to the input amplifier's gain (fig. 2, [008], lines 1-13)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize equalization signals comprise inter-symbol interference

("ISI") equalization currents of Torietto et al.'s to the equalization system of Garlepp et al as modified by Park et al 's equalizer in order to efficiently recover data from the data stream in the signal received via the communication media. The motivation to utilize Torietto et al.'s signals equalization signals was to improve on speed of receiver and compensate for the distortions of the channel.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Farad-Rad et al (US 7167517) discloses analog N-tap FIR receiver equalizer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helene Tayong whose telephone number is 571-270-1675. The examiner can normally be reached on Monday-Friday 8:00 am to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Liu Shuwang can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Helene Tayong

1/7/08

SHUWANG LIU
SUPERVISORY PATENT EXAMINER